LOCK WITH INCREASED TORQUE-RESISTING CAPACITY

Background of the Invention

1. Field of the Invention

The present invention relates to an inside rose liner for a lock. In particular, the present invention relates to a lock with improved torque-resistant capacity.

2. Description of the Related Art

A typical door lock includes a main body having an inside seat and an outside seat, an inside rose liner securely mounted to the inside seat, an outside rose liner securely mounted to the outside seat, an inside rose, an outside rose, an inside handle, and an outside handle. The inside handle and the outside handle of lever type are convenient to the disabled. The inside seat includes two diametrically disposed grooves, and the inside rose liner includes two diametrically disposed protrusions respectively engaged in the grooves of the inside seat. Similar design is adopted in the outside seat and the outside rose liner. The door lock of such a structure is simple and has a low manufacture cost. Nevertheless, the torque resulting from the force applied to the lever type handle for opening the door is relatively greater than that of a knob type handle. The simple engagement of the grooves and protrusions between the respective rose liner and the respective seat is insufficient to resist the torque if lever type handles are used. As a result, the inner parts of the door lock using lever type handles are apt to be damaged.

U.S. Patent No. 6,364,383 discloses an easy-to-install door lock with burglar-proof effect for the outside rose assembly, wherein each of the inside seat and the outside seat of the main body of the door lock includes two diametrically

disposed flat surfaces. Further, the inside rose liner includes a threaded inner periphery for threadedly engaging with an outer threading of the inside seat. An anti-torque ring is engaged on the outside seat for improving the torque-bearing capacity. The anti-torque ring includes a central hole having two diametrically disposed flat sections, allowing the anti-torque ring to be mounted around the outside seat without the risk of relative rotation and providing improved burglar-proof effect. An adjusting sleeve is threadedly engaged with the outside seat, with an end of the adjusting sleeve being securely engaged with a central stepped portion of the outside rose, and with the other end of the adjusting sleeve abutting against the anti-torque ring to thereby retain the anti-torque ring in place.

However, the adjusting sleeve of the door lock disclosed in U.S. Patent No. 6,364,383 has to be cylindrical, and the outside rose must be processed to form the central stepped portion for receiving the end of the cylindrical adjusting sleeve. The design flexibility of the outside rose is limited. Further, it is difficult to provide the cylindrical adjusting sleeve with high strength. Thus, the strength of the whole lock structure is limited.

Summary of the Invention

An object of the present invention is to provide a lock with increased torque-resistant capacity while allowing design flexibility of an outside rose of the lock.

In accordance with an aspect of the present invention, a lock includes a main body having an inside seat and an outside seat. An inside rose liner is mounted around the inside seat and includes a central hole. A peripheral wall delimiting the central hole of the inside rose liner includes at least one pair of notches. A reinforcing ring is mounted round the inside seat and inside the inside rose liner. The reinforcing ring includes two tabs each having a distal end

received in a respective groove of the inside seat, preventing relative rotation between the reinforcing ring and the main body. An outside rose liner is mounted around the outside seat. Two positioning posts extend from an inner side of the outside rose liner, with each positioning post having a screw hole. Two fasteners extend through the reinforcing ring and the inside rose liner into the screw holes of the positioning posts, thereby securing the reinforcing ring, the inside rose liner, and the outside rose liner together. The torque-resisting capacity is thus improved.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is an exploded perspective view of a lock in accordance with the present invention.

Fig. 2 is a sectional view of a door and the lock in accordance with the present invention mounted to the door.

Fig. 3 is a sectional view taken along line 3-3 in Fig. 1.

Fig. 4 is a perspective view, partly cutaway, illustrating an outside rose liner and a reinforcing ring mounted to an outside seat of the lock in accordance with the present invention.

Detailed Description of the Preferred Embodiment

Referring to Figs. 1 through 3, a lock in accordance with the present invention generally comprises a main body 5 to be mounted in a borehole 91 of a door 9. The lock further includes an inside rose 32, an outside rose 42, an inside handle 31, and an outside handle 41. The inside handle 31 and the outside handle 41 are of lever type, which is convenient to the disabled.

The main body 5 includes an inside seat 511 and an outside seat 512. The inside seat 511 includes a threaded section 513 having an outer threading 514. The outside seat 512 includes a threaded section 517 having an outer threading 518. A transmission assembly 52 is mounted inside the main body 5 and includes a spindle 521 and a retractor 522 operably connected to the spindle 521. Two ends of the spindle 521 are respectively connected to the inside handle 31 and the outside handle 41. Turning of either handle 31, 41 causes movement of the retractor 522, which, in turn, causes retraction of a latch bolt 21 of a latch assembly 2, which is conventional. Of course, the spindle 521 may consist of two sections respectively attached to the inside handle 31 and the outside handle 41.

The inside seat 511 includes two diametrically disposed screw holes (not shown), with two screws 515 extending through the screw holes of the inside seat 511 into screw holes (not shown) in the outside seat 512, thereby securely connecting the inside seat 511 and the outside seat 512 together. Further, the threaded section 513 of the inside seat 511 includes two diametrically disposed groove 516 respectively aligned with the screw holes of the inside seat 511, allowing easy mounting of the screws 515.

An outside rose liner 6 is mounted inside the outside rose 42 and around the outside seat 512. The outside rose liner 6 includes a central hole 61 having an inner threading 610 for threadedly engaging with the outer threading 518 of the outside seat 512. Two positioning posts 62 extend from an inner side of the outside rose liner 6 and extend through two positioning holes 92 in the door 9.

The inner rose liner 7 is mounted inside the inside rose 32 and around the inside seat 511. The inside rose liner 7 includes a central hole 71 threadedly engaged with the outer threading 514 of the inside seat 511. A peripheral wall 70 delimiting the central hole 71 includes a plurality of pairs of notches 711. One of

the pairs of notches 711 is selectively aligned with the grooves 516 of the threaded section 513. Further, the inside rose liner 7 includes a plurality of pairs of through-holes 712, with one of the plurality of pairs of through-holes 712 being selectively aligned with the screw holes 621 of the positioning posts 62.

A reinforcing ring 8 is mounted inside the inside rose liner 7. As illustrated in Figs. 1 and 4, the reinforcing ring 8 includes a central hole 81 through which the threaded section 513 of the inside seat 511 extends. Two diametrically disposed tabs 82 project from a periphery delimiting the central hole 81 of the reinforcing ring 8 and extending along a direction parallel to a longitudinal axis of the reinforcing ring 8, with an end piece 821 being formed on a distal end of the respective tab 82 and extending along a direction orthogonal to the longitudinal axis of the reinforcing ring 8. Further, two diametrically disposed extensions 83 project radially outward from an outer periphery of the reinforcing ring 8, with each extension 83 having a plurality of holes 831.

In assembly, as illustrated in Figs. 2 and 3, the relative position of the outside rose liner 6 on the threaded section 517 of the main body 5 is adjusted until the retractor 522 is aligned with the latch bolt 21. Namely, the lock in accordance with the present invention can be used with doors having different thicknesses. Next, the positioning posts 62 are aligned with the positioning holes 92 of the door 9, and the main body 5 is inserted into the borehole 91 of the door 9. Next, the inside rose liner 7 is mounted around the threaded section 513 of the inside seat 511, with a pair of notches 711 being aligned with the grooves 516 of the threaded section 513. Then, the reinforcing ring 8 is mounted inside the inside rose liner 7, with the respective tab 82 of the reinforcing ring 8 extending through an associated notch 711 of the inside rose liner 7, and with the end piece 821 being received in the respective groove 516 of the threaded section 513.

Preferably, the end piece 821 of the respective tab 82 of the reinforcing ring 8 has a width substantially equal to that of the respective groove 516 of the inside seat 511. Two fasteners (such as screws 16) are then extended through the associated holes 831 of the extensions 8 and the associated through-holes 712 of the inside rose liner 7 into the screw holes 621 of the positioning posts 6, thereby fixing the main body 5 to the door 9.

The inside rose liner 7 and the outside rose liner 6 are adjustably mounted on the inside seat 511 and the outside seat 512, respectively, allowing the lock in accordance with the present invention to be used with doors of different thicknesses. The reinforcing ring 8 cannot be turned relative to the main body 5, as the end piece 821 of the respective tab 82 of the reinforcing ring 8 is received in the respective groove 516 of the threaded section 513. The torque-resisting capacity is increased. Further, since the inside rose liner 7, the outside rose liner 6, and the reinforcing ring 8 are fixed together to securely fix the main body 5 to the door 9, the overall strength of the lock in accordance with the present invention is improved, and the engagement between the main body 5 and the door is more reliable. Further, the inside rose 32 and the outside rose 42 require no processing, providing design flexibility for the inside rose 32 and the outside rose 42; namely, the inside rose 32 and he outside rose 42 can be of any desired shapes, while the inside rose liner 7 and the reinforcing ring 8 provide the lock with improved strength and increased torque-resisting capacity.

Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the invention as hereinafter claimed.